EPA, DTSC, and CDPH reviews (December, 2017) of the Navy's Draft
Parcel G Radiological Data Evaluation Findings Report Draft (September, 2017)
Hunters Point Naval Shipyard, San Francisco, California

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Overall score of 2 = Recommend resampling, 0 = no significant signs of concerns, and 1 = needs further evaluation (1 was an interim score for tracking draft reviews. This is no longer to this final version of comments)

Please note: This review only includes the trench units that the Navy recommended as No Further Action/Evaluation in the September, 2017, draft Findings Report. Because the Navy already recommended the other trench units for resampling, EPA did not perform a similar detailed level of review for those.

Trench Unit	Overall score (0,1, or 2)	Box Plots	Q-Q Plots	Rounds of excavation	Gamma scan or static concerns
TU067	2	K-40 FSS results have very low variability, low concentrations, and appear to be from a different population than the other surveys conducted at TU067.	K-40 FSS results appear to possibly be obtained from a different population of soil than the other surveys conducted at TU067.	3	1 - Sampler name, off-site sample mass and COC forms for samples missing reports. 2 -Static survey not signed by RSO in SUPR 3 - Raw scan data not in SUPR 4 - Scan and static data do not appear to be consistent: static data highest was 4,843 cpm; scan data ranged from 2,530-6,240 cpm 5 -Scan data indicates unexpected variability (2,608 - 7,560 cpm) as the lowe values indicate radioactivity below background. Suspect poor data qualit deviation from workplan requirements
TU068	2	FSS results have very low variability compared to other surveys, especially for K-40, DG K-40 variability changes bewtween sampling events	K-40 FSS results appear to possibly be obtained from a different population of soil than the other surveys conducted at TU068.	3	1 - Sampler name, off-site sample mass and COC forms for samples missing reports. 2 -Static survey not signed by RSO in SUPR 3 - Raw scan data not in SUPR
TU069	2	RAS results for all radionuclides have low variability and for Ac-228 and Bi-214, indicate RAS results are from a different population than all other surveys/samples. K-40 FSS results have very low variability, low concentrations, and indicate ther are different populations among the surveys, DG K-40 variability changes bewtween sampling events	K-40 in FSS from a different popultaion	3	1 - Sampler name, off-site sample mass and COC forms for samples missing reports. 2 -Static survey not signed by RSO in SUPR 3 - Raw scan data not in SUPR 4 - Scan and static data inconsistent: highest count for statics was 4,676 cpm data ranged from 3,220 - 6,200 cpm
TU071	2	RAS samples show different population for Bi-214 K-40 FSS-Bias have a large variability indicating either heterogeneous soil or potentially different soil populations	RAS K-40 results look different than other two surveys, however only two RAS samples were collected. K-40 FSS-Bias has a wider range of values.	1	Gamma static survey data highest count was 6,165 cpm; scan survey data ra from 4,000 - 7,500 cpm. No range was provided for the Static survey data. No signature and date from RSO recorded on the Static Data Scan survey data not available for review, and no signature or date is recorde the RSO.
TU072	2	No anomalies noted	No anomalies	3	The Data Eval Form states the static data (highest count was 4,279 cpm) a inconsistent with the scan results (3,890-6,720 cpm) COCs not provided in SUPR
TU073	2	No anomalies noted	No anomalies noted, K-40 slope slightly different in SYS_1 but this is due to one or more low results in this set of data.	3	Scan data (highest count was 4,673 cpm) and Static data (4,240 - 8,750) are consistent. RSO signature and date missing from survey data, sampler not identified in

On vs offsite lab	Time Series	Suspect name (1=yes, 0=no)	Name, if suspect	Name, if not suspect	Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)	Signs of failure to follow workplan	Comments - Other	Followup needed, e.g. questions for Navy	See additional EPA statistical analysis	
According to Data Eval Plan, the on-site vs off-site data are consistent	Some very low results for Bi-214 and K-40 occur on the same days in the characterization and biased surveys, indicating that the samples collected on these dates are from a different population of soil than other results for the survey.	1	R Roberson		1	1 -RAS results look suspicious due to very low variability 2 - Data Eval Review form indicates allegations associated with this TU. From NRC petition, a former worker alleges that RSY-2 laborers were directed by J. Taylor to collect less than the Work Plan-required number of samples from soil excavated from TU067. Taylor told them to go get a sample "from anywhere." They went behind the Conex to another pad and got an unrelated "false" sample. Allen and Reggie 3 - Some very low results for Bi-214 and K-40 occur on the same days in the characterization and biased surveys, indicating that the samples collected on these dates are from a different population of soil than other results for the survey. 4 - missing COCs and raw scan data in reports	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPRs	This survey unit is suspect for the following reasons: 1 - Former worker allegations regarding screening of soil from this trench unit at the RSY2. This indicates a high potential that FSS results could also have been falsified 2 - RAS results do not have normal variability - suspect for falsification 3 - K-40 FSS results look like they are from a different popultaion than other surveys 4 - COCs and names of samplers missing in SUPR 5 - No RSO signatures on survey results 6 - Raw scan data missing from SUPR Recommend for re-sampling			
According to Data Eval Plan, the on-site vs off-site data are consistent		0		P Vigil	1	1 -RAS results look faked due to very low variability 2 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports 3 - Multiple excavations, adjacent to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2 4- Population of K-40 on is much more variable on 9/19/07 than the remaining 10 events. From 9/19/07 to 9/20/07 variability drops.	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPR	This survey unit is suspect for the following reasons: 1 - Variability in sample results for FSS low - suspect for falsification 2 - K-40 FSS results look like they are from a different population than other surveys 3 - COCs and names of samplers missing in SUPR 4 - No RSO signatures on survey results 5 - Raw scan data missing from SUPR Recommend for re-sampling			
According to Data Eval Plan, the on-site vs off-site data are consistent	Sys-1 and FSS-Bias results for K-40 are from a different population than the RAS of FSS. This indicates there may be different populations of soils/samples represented between the different surveys.	1	A Jahr		1	1 -RAS results for all radionuclides have low variability. 2 - Ac-228 and Bi-214 RAS results are from a different population than all other surveys/samples 3 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports 4 - Multiple excavations, near to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2, DG K-40 more variable on 9/19/07 and 10/17/07 then other sampling events. 5 - Worker involved in allegations included in sample team 6 - K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPR	This survey unit is suspect for the following reasons: 1 - RAS results do not have normal variability and are from different popultaiton than other surveys for Ac-228 and Bi-214 - suspect for falsification 2 - K-40 FSS results look like they are from a different popultaion than other surveys 3 - COCs and names of samplers missing in SUPR 4 - No RSO signatures on survey results 5 - Raw scan data missing from SUPR 6 - Worker involved in allegations performed work at this TU Recommend for re-sampling			
According to Data Eval Plan, the on-site vs off-site data are consistent	Cs-137 results were mostly non-detect or negative. Cs-137 results should not be mostly negative. This indicates a potential data quality issue.	0		P Vigil	1	1 - Scan survey data not available for review 2 - Static data range not provided in Data Eval Form. 3 - No RSO signature and date provided for static or scan data	1	Missing scan data, and static data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPRs	1 - Remediation was performed due to Cs-137, the time series plots show that most of the characterization results for Cs-137 were at or near zero, or were negative values. This indicates a data quality issue, and thus, un-reliable data. 2 - Gamma scan data missing, and no RSO signature and date on static and scan data. Recommend resample to confirm ROC concentrations for Ra-226 and Cs-137	Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results." Need explanation on what this means.		
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends idenitified	1	R Roberson		1	1 - Inconsistent scan and static data; highest count for static survey was 4,279 cpm where scans ranged from 3,890 - 6,720 cpm 2 - SUPR missing COCs 3 - Worker involved in allegations included in sample team	1	Missing Chain-of-Custodies (COCs) in SUPR Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Scan and Static data are inconsistent 2 - SUPRs do not contain COCs for samples collected. Without this documentary evidence, the integrity, location, date, time or evidence of who had custody of the samples is missing. Therefore, the data is not defensible and not usable for decision making. Recommend resample to confirm ROC concentrations			10
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends identified.	0		P Vigil	1	1 - Scan and Static data inconsistency; narrow range of static data values which is not consistent with environmental monitoring. 2 - RSO signature on scan and static data results is missing 3 - Suspect worker involved with data collection	1	Missing RSO signatures on scan and static data results in SUPR Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - TU is downstream from Building 274 used for decontamination training and offices, Building 322 used by NRDL for development of radiation detection instrumentation (no contamination found and building demolished), and Buildings 313, 313A used by NRDL for Instrumentaiton laboratory and as stockroom and storage areas. 2 -Cs-137 was found above the action level in 2002; but no evidence of residual radioactivity above the release criteria was found in 2014.		EPA statistician prepared additional specific analysis for this survey unit, shown separtely	13

TU074	2	No comparisons made - only one set of FSS data collected. Data are highly variable	No comparisions made - only one set of FSS data collected	0	1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5 cpm; scan ranged from 1,630 - 6,750 cpm. 2 - Low value in scan data unusual because it is below background. 3 - Small range/low variability in Static results 3 - Scan data performed after FSS sample collection.
TU075	2	Each event for each ROC has different variability with varying means. RAS and Bias results are slightly higher when compared to SYS-1 or FSS results for Ac-228 and Bi-214; however the number of RAS and FSS-Bias results is small and the differences in concentration ranges are relatively small..	RAS and FSS-Bias K-40 data have a different slope than SYS-1 or FSS data sets, however range of values for RAS and FSS-Bias is only slighlty different and number of samples is small	2	1 - Data Eval Form noted that there were negative results for Ra-226, low l concentrations, and two results for Ac-228 at or below 0 pCi/g. 2 - Static and scan data are not consistent. Static results ranged from 4,200 - cpm; scan data ranged from 1,370 - 7,720 cpm. 3 - Low values in scan data are unusual because these low values are signifi lower than background.
TU076	2	All surveys/sample collection results have low and/or non-detect results for Ac-228	K-40 results have large range of values/variability, especially in FSS.	4	Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data from 3,000 - 7,000 cpm
TU078	2	All surveys/sample collection results have low and/or non-detect results for Ac-228 except for FSS-Bias results K-40: mean stays the same but spread up and down varies between events Cs-137: negative measurments appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels	K-40 FSS has large range of values compared to other survey units.	4 to 5	Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data from 3,000 - 7,000 cpm
TU079	2	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data	0	Static and scan data inconsistent. Static ranged from 5,326 - 5,943; scan data from 3,430 - 6,790 cpm

According to Data Eval Plan, the on-site vs off-site data are consistent	It is noted that extremely low results for Ac-228, Bi-214, and K-40 reported on the same days, indicating a potential problem with the data on these dates. Time series plots dates were not legible	0		P Vigil	1	1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm. 2 - Low values in scan data unusual because the low counts per minute are within a range that is below background. 3 - Scan data performed after FSS sample collection.	1	Scan data collected after FSS sample collection which is a departure from the Work Plan. Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - TU074 was not remediated but is adjacent to TUs 81 and 83 which did have contamination. 2 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shopt,and offices, a trades shop, and general store. No contamination is expected to have been released from this building; however, TU075 which was also connected to Bldg. 401 did have contamination. 3 - Scan and Static data are inconsistent, with unusually low results in scan data and in FSS data. 4 - Scan was performed after FSS samples collected. 5 - Sampler not identified in SUPR, person responsible for gamma scans and static measurements is listed on the NRC petition as a suspect worker. Recommend for re-sample			
According to Data Eval Plan, the on-site vs off-site data are consistent	Ac-228 and Bi-214 RAS and Bias results are from a different population than SYS-1 or FSS results	0		P Vigil	1	1 - Inconsistent static data (4,200 - 6,200 cpm) and scan data (1,370 - 7,720 cpm), scan data includes results below background levels. 2 - Suspect worker involved in data collection. 3 - Each event for each ROC has different variability with varying means.	1	Section 4 of the Data Eval Form states that there was no mention of pipe swipe surveys or sediment sampling in manholes. This would indicate a deficiency in the investigation and a departure from the Work Plan. Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g. Reviewer comment: this could indicate poor data quality and/or falsification. 2 - Static and scan data are inconsistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm: Low values in scan data are unusual because these low values are significantly lower than background. 4 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shopt,and offices, a trades shop, and general store. The narrative states that no contamination was found on surfaces or drains in the building, therefore it is not expected that contmamination released from this building. 5 - Section 4 of the Data Eval Form discusses the contamination that was found in this TU, despite the purported lack of contamination in Bldg 401. The narrative also states that there was no mention of pipe swipe surveys or sediment sampling in manholes, therefore the investigation did not follow the Work Plan and is deficient. This is important to note because contamination was found in this trench. 6 - Suspect worker involved in static/scan surveys Recommend re-sampling.	Need to look at data more closely to identify possible reasons for data inconsistencies. For example: Were scan and static data sets approved/signed by RASO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?	EPA statistician prepared additional specific analysis for this survey unit, shown separtely	
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	1	J Cunningham		1	1 -Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm. Range for static data is too small indicating static data is falsified. 2 - All surveys/sample collection results have unusually low and/or non-detect results for Ac-228. This indicates either poor data quality or falsification. 3 - Suspect worker involved with data collection.	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. 2 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification. 3 - Suspect worker involved in data collection. 4 - Probable data quality issues with low Ac-228 results. Adjacent TUs 078, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results. Data Eval Form states TU076 is adjacent to Bldg 411. Similarily, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076. Recommend re-sample.	Need to look at data more closely to identify possible reasons for low or non-detect Sc-228 and data inconsistencies. For example: Were scan and static data sets approved/signed by RASO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?		
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	0		S. Brown	1	1 -Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm. Range for static data is small. 2 - Scan data is reported to be exactly the same as TU076 (3,000 - 7,000 cpm) 3 - Unclear whether Scan/Static personnel S. Brown is the same as Emitt Brown from NRC list 4 - K-40: mean stays the same but spread up and down varies between events Cs-137: negative measurments appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. 2 - Adjacent TUs 076, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results. 3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification. 4 - It is unclear whether suspect worker was involved in data collection. Data Eval Form states TU076 is adjacent to Bldg 411. Similarily, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076. Recommend re-sample.			
According to Data Eval Plan, the on-site vs off-site data are consistent	Variable data, large range of values	0		P Vigil	1	Static data (5,326 - 5,943 cpm) and Scan data (3,430 - 6,790 cpm) are not consistent, static data has very narrow range of values compared to what would be expected for environmental conditions.	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079. 2 - Static and scan data are inconsistent; static results ranged from 5,326 - 5,943 cpm and scan data ranged from 3,430 - 6,790 cpm. 3 - Suspect worker involved in data collection. 4 - One sampling event with very narrow range in static results, indicating static data was collected from only one or two locations rather than 5 - Probable data quality issues with Ac-228 results, Adjacent TUs 076, 078, and TU108; and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0. .	Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.		

TU080	2	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data	0	Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; S ranged from 4,250 - 6,500 cpm
TU082	2	All survey types had very low concentrations of Ac-228, or concentrations at 0; RAS results for Ac-228 also had negative values FSS-BIAS spread different for K-40 then other events however mean is similar. Cs-137 affected by negative values.	No anomalies in trends observed; howevere Ac-228 results were low, with some reported as 0 or negative (RAS).	2	1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collec 05/08/08; reports however, were generated on 05/05/08. Record of collectio for sample 57 may be typographical, or may indicate falsification. 2 - Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - cpm).
TU083	2	All surveys resulted in low and/or negative values for Ac-228. Narrow range and low values noted for Bi-214 in the FSS-SYS (conc ranges from approximately 0.3 - 0.45 pCi/g). The box plots do not provide the uncertainty values associated with any of the results so it is not clear how accurate these results are at such low concentrations. K-40 results were fairly consistent between survey types, but all surveys had highly variable (large range of vlaues between approximately 1 or 2 pCi/g - 30 pCi/g) in all surveys.	All three surveys for K-40 had similar distributions, with a large range of values	2	1 - The FSS results demonstrate high variability in K-40 results but low variab Ac-228 and Bi-214. 2 - Pb-214 noted to have two populations 3 - Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are incons Static data range not provided. 4 - Data Eval Form states Static data are potentially falsified but no evide regarding sampling falsification is available. 5 - Static scan date and time not provided in SUPR 6 - Scanning was performed after FSS samples collected.
TU085	2	Box Plots show concern, K-40,B-214 FSS are from different populations. Box plot Ac-228. RAS appeared to show greater variability and activity than the other sets. The biased samples appear to represent a less diverse and lower activity population compared to the others. The biased samples should have been collected at the hot spots. Bi-214 shows similar. Same for K-40 . Ac-228, Bi-214	Q-Q plots - slope breaks show sometimes flatter, sometimes steeper, could mean different populations	8 with 10 rounds of sampling	Navy indicates scans and statics are consistent
TU087	2	Only one set of SYS samples collected. No bias samples. Unusually small variability for Bi-214 is suspicious.	Slope break on all 3 - indicates two populations.	1	None noted. Gamma and statics noted to be consistent, but no elevated s found in gamma scan. Unclear if this means that highs could have been delet bias samples collected.
TU088	2	SYS-1 has more variability than any of the other data sets. FSS-Bias slightly less variable than FSS-SYS. FSS-SYS has less variability and a lower mean than the other data sets.	Slope break on all 3 - indicates two populations.	4	None noted. Gamma and statics noted to be consistent.
TU089	0	Only one set of SYS samples collected. No bias samples because no gamma scan exceedences.	Slope break on all 3 - indicates two populations.	1	None noted. Gamma and statics noted to be consistent.
TU091	2	K-40 and Ac-228 FSS_Bias appear to be different population - lower mean, less variability for Ac-228, less variability for Ac-228. For Bi-214, FSS-SYS and FSS_Bias are about the same and less variable than FSS_1.	Appear to be slope breaks on Ac-228 and Bi-214 plots	3	None noted. Gamma and statics noted to be consistent.
TU092	2	Bi-214 appears to have unusually low variability.			None noted. Gamma and statics noted to be consistent.

On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	Variable data, large range of values	1	R Zahensky		1	Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079. 2 - Adjacent TUs 076, and TU087 (also adjacent to Bldg. 411); and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0. 3 - Static and scan data are inconsistent; static results ranged from 6,089 - 7,126 cpm and scan data ranged from 4,250 - 6,500 cpm. 4 - Suspect worker involved in data collection. 5 - Probable data quality issues with Ac-228 6 - 1 sampling event	Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in this building. HRA info is needed to evaluate potential for contamination of sewer lines/TU080.		
Data Eval Form states data were consistent	No anomalies in trends observed; howevere Ac-228 results were low, with some reported as 0 or negative (RAS).	1	J Cunningham		1	1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification. 2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).	1	Inconsistencies in date of when data was collected for sample 57 in comparison to issue date of report indicates either poor record-keeping or potential falsification of the sample result, both of which would be a departure from Work Plan requirements.	1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification. 2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm). 3 - Suspect worker involved with data collection. 4 - TU082 is adjacent to TUs 077, 080, 081 which all included several Ac-228 results at or below 0. Data Eval Form incidates Bi-212 and Pb-212 in the Th-232 decay series were consistent with other sample results in TU082. This may indicate a data quality issue with the analysis and reporting of Ac-228. Recommend for re-sampling		EPA statistician prepared additional specific analysis for this survey unit, shown separtely	
On-site lab reported higher values than off-site lab, including one result for K-40	Large range of values are reported for all survey types for K-40, which appears to indicate more than one population of soil type may be represented in the data.	0		M Snyder	1	1 - The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214. 2 - Pb-214 (daughter of Ra-226) noted to have two populations 3 - Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent. Static data range not provided. 4 - Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available. 5 - Static scan date and time not provided in SUPR 6 - Scanning was performed after FSS samples collected.	1	Scan data collected after FSS sample collection. Static date and time missing from SUPR. Scanning was performed after the FSS samples were collected.	1 - Sanitary sewer is associated with Bldg 401. Data Eval Form states that Bldg 401 was not identified in the HRA but that after it was leased, sealed radiological sourcs (dials and gauges) were stored in the building. Data Eval Form also states no contamination was identifed on surfaces or drains, therefore there is no reasonable potenetial that Bldg 401 activities contaminaed the sewer system. Note: Based on revelations about building scan falsification issues, the reviewer questions how thorough or accurate surveys done on surfaces or drains in this building were. 2 - Adjacent TUs include 076, 123, and 124. 3 - Static and scan data are inconsistent; static results were not provided but scan data ranged from 2,000 - 5,000 cpm. Even number cpm values is suspect. 4 - Scan data collected after FSS. This is suspect for falsification of Scan and Static measurement data. Recommend re-sample.	Is Bldg. 401 going to receive additional investigation? Static data range needs to be added to this Data Eval Form for TU083		
3 samples have values that differ by more than 10x: Form states, "For sample 70-PDT-085-30 values differing by more than 10X: Am-241 (0.05 pCi/g vs -0.47951 pCi/g), Cs-137 (-0.031 vs 0.057843 pCi/g), Eu-154 (-0.04 vs -0.00499 pCi/g), For sample 70 PDT 085-31 values differing by more than 10X: Am-241 (0.002 vs 0.024914), Cs 137 (-0.002 vs 0.076543). For sample 70-PDT-085-33 values differing by more than 10X: Eu-154 (0.004 vs 0.084744 pCi/g)."	Form notes, "Some Characterization samples display different characteristics from other bias, characterization, and final systematic samples."	0		P DeLong	1	Mean and variability of bias samples less than FSS_SYS and characterization samples. Appear to represent a different population. Multiple rounds of excavation. On- and off-site samples differ by more than 10x.	0		Recommend resampling to confirm ROC concentrations for several reasons - inconsistent off-site lab results, mean and variability of bias samples inconsistent with FSS_SYS samples that appear to be a different population, evidence for multiple populations on Q-Q plots, 8 rounds of excavation.			
Two samples vary by more than 10x: Form states, "For sample 70-PDT-087-10 values differing by more than 10X: Tl-208 (0.022043 vs 0.344), U-235 (-0.99377 vs 0.08). For sample 70-PDT-087-11 values differing by more than 10X: Am-241 (0.03806 vs 0.001), Cs-137 (0.049789 vs -0.0006), Eu-154 (0.11423 vs 0), and Pa 234m (0.16956 vs -0.007)."	1 Ac-228 result below 0	1	R Roberson		1	10x difference between on- and off-site lab in 2 samples. Unusually small variability in Bi-214 data set.	1	No bias samples collected. Gamma scan conducted after FSS samples were collected.	This could be a data set where the scans were manipulated to remove highs, and then the FSS samples were biased to areas with low gamma scan result, but the form indicates that the gamma scan was performed after the FSS samples were collected. 7 manholes removed from this TU. Elevated gamma survey results were identified for Manholes MH340 and MH342, which were disposed as LLRW. Falsification identified in adjacent TU0086. Concern only moderate - could be real data.			
	1 Ac-228 result below 0	1	A Jahr		0		0		Lower variability in FSS-SYS and FSS-Bias may indicate successful remediation or could indicate potential falsification (narrow range unusual). Low-to moderate concern. May be candidate for Tier 2 resampling. K-40: 1 event (3/4/08 RAS) has less variability than other 8 events.			
	2 Ac-228 results below 0	0		P Vigil	0		1	No bias samples collected.	1 event. Otherwise no concerns			
		1	J Cunningham		0		0		Box plots and Q-Q plots indicate different populations. Less variability in Bi-214 samples may mean success in remediating this SU, but could also mean falsification. Resample due to uncertainty.		EPA statistician prepared additional specific analysis for this survey unit, shown separtely	
	2 Ac-228 results below 0	0		M Snyder	0		0		Due to identification of Cs-137 in a pipe removed from this TU, 37 biased samples were collected from the bottom of the trench. No exceedances. Low to moderate concern due to unusually low variability for Bi-214. However, this site was a Cs-137 site. Resample due to uncertainty.			

TU093	2	Ac-228 and Bi-214 FSS_SYS and FSS_Bias have less variability than the SYS_1 samples Negative Cesium values beginning in 5/30/2008	Bi-214 has unusually small range for FSS samples compared to characterization samples.	3	Form states, "Gamma scan dataset consistent with FSS sample dataset b inconsistent with static data. No date or time recorded for static survey in S Static measurements were inconsistent with scan data (slightly larger than th range) but still less than the 3 sigma scan level."
TU096	2	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.	Appear to be slope breaks on Ac-228 and K-40 plots, probably 2 populations.	1	Form states, "Static survey date and time not provided in SUPR Gamma static dataset inconsistent (small variance) with FSS sample dataset gamma scan dataset. Gamma static measurements do not appear to repre conditions at TU096".
TU097	2	FSS_SYS has low variability for Ac-228 and Bi-214 compared to characterization and FSS_1. However, K-40 shows the opposite (more variability). FSS_SYS samples appear to be a different population.	Bias sample plots for Ac-228, Bi-214, and K-40 have slope breaks, indicating multiple populations. Form notes, "Samples 9 to 79 show low concentrations of Bi-214 and Ac-228. Samples 9 to 40 were collected on 08/19/2008. Samples 41 to 79 were collected on 08/20/2008. These samples were counted on 08/21/2008, 08/22/2008, and 08/25/2008. These samples were not biased to a specific location, but were distributed along the bottom of the trench to investigate potential leaks from the pipes. These samples do not appear to be representative of conditions at TU097. The small volumes of soil removed to remediate areas of elevated activity would not result in changes to the entire distribution." KB notes one inconsistent reference to TU 096.	7	Form notes: "Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (low variability) with FSS and gamma s dataset. Gamma static measurements do not appear to represent conditio TU096. Gamma scan results consistent with FSS dataset and inconsistent gamma static dataset." and "No measurements above the investigation lev identified during the performance of gamma scans in Trench Unit 97. Sevent investigative samples were collected along the trench bottom at 3-foot inte because pipe sediment samples identified cesium-137 (Cs-137) activity at 0. to 0.26670 pico Curie per gram (pCi/g) and radium-226 (Ra-226) activity at 1.8 3.4019 pCi/g. Six of the investigative sample results identified Ra-226 activity present at 1.8799 to 2.4089 pCi/g."
TU098	2	K-40 - mean for Final is highest and less variable. Seems odd that FSS would have a different mean from the others. Ac-228 and Bi-214 have similar means, but less variability. for FSS_SYS. No FSS Bias samples collected. Negative CS-137 values; Ac-228 and Bi-214 mean is higher and more variable for 1/13/09 event as compared to others appears to be a different population.	Slope break on all 3 - indicates two populations.	6	Form states, "Reported gamma static counts are suspect; ranged within unusually narrow band between 4,211 and 4,632 gcpm. No reviewer or revie reported. Gamma static counts are not consistent with the reported gamma range and FSS dataset. " Also, "Scan range reported as 2,900 to 9,400 gcp apparently exceeding the investigation level of 7,048 gcpm without furth explanation. This gamma scan range is not consistent with the gamma static but could be consistent with the FSS dataset. "
TU099	2	Cs-137 samples show unusually low variability. K-40 outliers. No FSS_Bias samples	K-40 plots have slope breaks, as do characterization samples for Ac-228 and Bi-214, suggests multiple populations	15	Form notes: " Static survey date and time not provided in SUPR. Static res reported low variability, inconsistent with gamma scan results and Final Syst dataset."
TU100	2	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.	All 3 plots have slope breaks, suggest more than one population in FSS_SYS.	1	Form notes: "No signature and date from site RSO was recorded on this surv gamma scan data was available for review to compare with the FSS samples dataset static/scan results." Also no signature for static survey.
TU101	2	Ac-228 and K-40 FSS_SYS have greater variability than SYS_1 or characterizations sets. Bi-214 characterization samples appear to be different population (lower variability, smaller data range). No FSS_Bias samples. Form notes: "Sample distribution of Final Systematic samples is slightly more variable compared with other sample types of Bias and Characterization. One outlier was identified for Bi-214 and Ac-228."	Ac-228, Bi-214, K-40 FSS_SYS have slope break, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples.	2	Form notes: "The scan survey was performed on 07/19/2008 Scan range for Instrument is 2,970 – 6,590 cpm, exceeding the 3-sigma investigation level fo 1 instrument (6,161 cpm). No signature and date from site RSO was recorded survey. No gamma scan data was available for review to compare with the Systematic samples specific dataset static/scan results." For statics, "The hi count was recorded at 5,842 cpm for sample location 029." Unclear, but samples should probably have been collected.

Form states, "The on-site and off-site laboratories reported Ra-226 activity above the MDA/MDL for both samples. As a result, the Ra-226 activities for two samples were compared directly for precision. The results of the comparison showed relative percent differences (RPDs) from 95.12 to [and] 117.38. Because the on-site laboratory reported higher Ra-226 activity than the off-site laboratory and the RPDs were not within 30, as stated in the Sampling and Analysis Plan." None of the FSS samples were sent to the off-site lab, which should have been done.	1 Ac-228 result below 0	0		J Gutierrez	0		1	No date for Statics.	One pipe segment had Cs-137 above release criteria, so 23 biased samples were collected along the trench bottom. No contamination found. However, due to the low variability of the Bi-214 data, the lack of an off-site lab sample for the FSS data set, and the scan/static inconsistencies (including no dates for the static survey), this SU should be resampled.			
consistent	2 Ac-228 results below 0	1	J Cunningham		1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1	No bias samples collected. No date for statics.	Resample. (no date for statics, statics inconsistent with TU 96; no biased samples; low variability in Bi-214 results.) 1 event			
7 samples noted to be consistent.	Form notes, "Initial Bias and other bias results display different characteristics from other Bias, Characterization and FSS samples." and for K-40, " Notes: FSS sample 129 had a high result different from other samples." For Ac-228, there were several biased sample results at or below 0.	1	J Cunningham		1	Form notes, "Based on the findings of this evaluation, evidence of potential data falsification was found. It is unlikely the Biased Samples 9 to 79 represent actual conditions within TU097." KB notes that the inconsistent static survey data also indicates probable falsification.	1	No date for Statics.	Resample. (no date for statics, statics inconsistent with TU 97; no biased samples; low variability in Bi-214 results; falsification noted by Navy.). K-40 FSS different population. Ac-228 and Bi-214 appear to be different populations at different times.			
	Form states about first samples, " The Visual Sample Plan (VSP) was used to generate 18 systematic sample locations (samples 1 to 18) based on a random start point and a triangular grid. Four of the sample results identified radium-226 (Ra-226) activity to be present at 1.7536 to 2.7581 picocuries per gram (pCi/g). Based on this information, 29 additional samples were collected to further characterize the trench. Characterization sampling identified five additional locations where Ra-226 activity was identified to be present above the release criteria, at 1.5349 to 3.7863 pCi/g. "	0		C Hughes	1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1	No sampler name.	Recommend resample to confirm ROC concentrations (statics inconsistent with gamma scan data set, low variability in Bi-214 results, no biased samples)			
Form notes only 2 samples, inconclusive	Forms note for Bi-214 and Ac-228: "Third set of characterization data shows a different distribution from other data."	1	D DeLong		1	Inconsistent statics, no final bias samples, third set of characterization data has different distribution. 22 sampling events - Results for Ac-228, B-212, and Bi-214 have different variability for the Sys_1 2/2/09 sampling event. Similar to S0119. Cs-137 different for the 11/13/08, 5/13/09, 6/12/09 and 6/18/09 events.	1	No static survey date and time, no sampler/surveyor name	Some samples not analyzed within 2 weeks. Cs-137 remediation,Highest Cs-137 concentration recorded in Parcel G, but unusually low Cs-137 variability. Too many rounds of excavation. Inconsistent statics, different data distributions. Resample to confirm ROC concentrations			
Form says consistent.		1	R Zahensky		1	No final bias samples, low variability in B-214 data set. No gamma scan data in SUPR.	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.	No biased samples. Missing signature and lack of gamma scan data is troubling. Low variability in B-214 data. Only 1 sampling event FSS-SYS. Need to resample.			
Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."	Form notes: "The data range for K-40 from 4.68 through 14.96 pCi/g."	1	R Zahensky		1	No gamma scan data available. Should have been in SUPR.	1	No Site RSO signature, no FSS_Bias. Gamma scan data suggest statics should have been collected.	Should resample due to uncertainty - lack of gamma scan data, no FSS_Bias samples, different populations in data sets.			

TU102	2	Ac-228, Bi-214, K-40 FSS_SYS have greater variability than other two data sets, while characterization samples have less varability. Cs-137 characterization data has the most variability. No FSS_Bias. Form notes: "Final Systematic sample distribution more variables compared to Bias and Characterization samples for Ac-228, Bi-214, and K-40."	Ac-228, Bi-214, K-40 FSS_SYS have slope breaks, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples. Form notes: "The graph is more vertical than expected for the Final Systematic Ac-228 samples."	2	Form notes: "The scan survey was performed on 07/11/2008 Scan range for 7 Instrument is 2,310 – 5,960 cpm. The 3 sigma investigation level for 235(Instrument was 6,161 cpm. No signature and date from the site RSO was rec on this survey. No gamma scan data was available for review to compare wi Final Systematic samples specific dataset static/scan results." FORM for TU notes about TU102: "The static data results for TU 102 is inconsistent comp with the adjacent trenches. The lowest static count was reported for TU102 a cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highes count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU1
TU103	2			3	FSS Scan data elevelated compared to sample data/several samples may hav substituted, Gamma Scan Survey performed on 05/28/2009 at 13:40 on the day as Final Systematic Sample collection. Gamma scan dataset inconsistent with static data. Scan Data range 2,910 – cpm, exceeding the investigation level of 7,048 cpm. Static data range 3,1(3,400 cpm.
TU104	2		abnormally narrow range of measurement values.		Gamma Scan Survey performed on 05/28/2009 at 13:40 on the same day as Systematic Sample collection. Scan survey performed on 09/30/2008 at 07:40 prior to FSS sample collect Gamma static dataset inconsistent with scan data and FSS sample dataset. range from 3,900 – 4,300 cpm with a STDEV of 136 cpm. Scan data has a rar 1,170 – 8,170 cpm exceeding the investigation level of 4,078 cpm.
TU106	2				Static survey date and time not provided in SUPR. Gamma static datase inconsistent (standard deviation of the static measurements is too small a cpm) with scan data and Final Systematic sample dataset. Scan survey perfo on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data incons with FSS sample dataset and static data.
TU107	2				Scan survey performed on 10/14/2008 at 08:15 prior to Final Systematic sa collection. Gamma scan contained measurements greater than the 3-sig threshold. No date or time recorded for static survey in SUPR. Gamma static consistent with scan data and Final Systematic sample dataset
TU108	2	Cs-137 has more variability and different mean for the 5/30/08 event compared to the 5 events.			Scan survey performed on 05/06/2009 at 13:50 after the commencement of Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sig investigation level of 7,048 cpm.
TU111	0				Scan and static survey date and time were not recorded
TU115	2	Bi-214 and Ac-228 indicate multiple populations by date	Different slope in line on final. One way falsification caught in 2012 was K-40 for FSSR not the same as original. Slope for Ac-228 looks like 2 different populations in biased samples.FSS samples display characteristics of two data populations for Bi-214, Ac-228, and K-40		Scan measurements above investigation threshold inconsisten w/ FSS sam samples could have been taken in areas with lower count rate in trench
TU116	2	K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events			Scan survey performed on 04/27/2009 at 08:45 prior to the commencemer Final Systematic sampling. Some scan measurements exceeded the sca threshold.
TU117	2				Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collec Gamma scan dataset not consistent with static dataset.
TU118	0				1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sa collection. Gamma scan dataset not consistent with static dataset.
TU119	2			7	
TU121	2				Gamma static counts ranged within a narrow band between 3,984 gcpm a 4,747 gcpm and are not consistent with the gamma scan range or FSS data Performed by a suspect worker; no reviewer or review data reported. Perfor 01/24/2009 at 09:40h by a suspect worker. Scan range listed as 3,300 – 7,700 gcpm, apparently exceeding the IL of 7,048 gcpm without fu explanation. This gamma scan range is not consistent with the range of ga static counts described above, but is consistent with the FSS dataset.

Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."Data inconsistent with Final Systematic sample (046) for the K-40 results. Onsite result was 20.29 pCi/g while the offsite result was 8.2 pCi/g."	Form notes: "The data range for K-40 from 5.06 through 20.22 pCi/g."	1	R Zahensky		1	Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.	Cs-137 remediation, K-40 may be from different pop, Recommend Resample to confirm ROC concentrations	See TU101 form, which notes "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. " Is this relevant for TU101 or 102?		
		0		C Hughes	1	1) Sampler Namer Not provided in SUPR. 2) Biased samples have low activity concentration when compared with the FSS samples even though gamma scan meausements were higher; therefore, samples may have been collected somewhere else	1		Biased Samples may have been collected somewhere else within the trench or elsewhere, Resample to confirm ROC concentrations,			
		0		C Hughes	1	1) Sampler Namer Not provided in SUPR. 2) No Bias Samples collected when warranted by Scan measurements, samples may have been collected somewhere else within the trench	1	yes, No BIAS Samples collected based on scan data	No Bias samples collected when warranted based on Scan Survey. Resample to confirm ROC concentrations. 1 event			
		0		C Hughes	1	1) Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset.. 2) Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0		Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations			
		0		C Hughes	0	Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0		Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations			
		0		C Hughes	1	Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm. Bias Samples have lower overall activity when compared with FSS samples.	1	yes, No BIAS Samples collected based on scan data	Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?	Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?		
		1	J Cunningham		0		1	the scan and static survey date and time were not recorded	work performed by suspect worker, only 1 sampling event			
		1	B Evans		1	K-40 Final sample set appears different from earlier. Ac-228 shows 2 different populations, scan measurements higher earlier inconsistent with final sample results	0		Close to impacted area, had a lot of remediation, Difficult to excavate more. Suspect worker Identified			
		0		C Hughes	1	Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold. K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events	0	1	Biased samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations			
		1	J Cunningham		1	Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	0		Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Only 1 sampling event - FSS-SYS			
		0		C Hughes	0	1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	0		Only 1 sampling event - FSS-SYS			
		1	J Cunningham		0	Bi-214 have different variability for the Sys_1 2/2/09 sampling event.	1		Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations			
		1	J Cunningham		1	Some of the samples collected appear to be from a different population	1	yes, No BIAS Samples collected based on scan data for FSS	Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations		EPA statistician prepared additional specific analysis for this survey unit, shown separtely	

TU124	2			3	Static survey date and time not provided in SUPR. Gamma static dataset inconsistent with scan data and Final Systematic sa dataset The static gamma measurements, which were collected before sampling, d reflect the variability observed in either the range of the scan results or t analytical results. The scan range and sample activity range appear plausib should be noted that scan results above the investigation level were appar never investigated or sampled. Static range = 3,748 – 4,220 cpm Scan range = 1,390 – 8,240 cpm (investigation level = 7,048 cpm) Sample activity range (K-40) = 3.5 – 13.5 pCi/g Scan range = 1,390 – 8,240 (investigation level = 7,048 cpm) Scan survey performed on 07/06/2012 at prior to Final Systematic sample collection. Gamma scan dataset inconsistent with static data and/or Final Systematic s dataset.
TU151	0	Box Plots show concern		1	Performed by a suspect worker; no reviewer or review data reported.
TU204	2	Box Plots indicate Narrow Range, but scan data indicates a larger range			The scan survey was performed on 06/15/2011. Scan range for 2350-1 Instru is 4,000 to 7,610 cpm. The 3 sigma investigation level for 2350-1 Instrumen 8,014 cpm. No signature and date from the site RSO was recorded on this su No raw scan data was provided in the SUPR.
Please note: The above review only includes the trench units that the Navy recommended as No Further Action/Evaluation in the September, 2017, draft Findings Report. Because the Navy already recommended the other trench units for resampling, EPA did not perform a similar detailed level of review for those.					

	FSS samples appear to be from a different population	1	D DeLong		1	1)Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations	0		Suspect Worker, FSS Samples appear to be from a different population of samples. Samples may have been collected somewhere else , Resample to confirm ROC concentrations 6 RAS events followed by 2 FSS events. Variability for Ac-228 and Bi-214 for the final 2 FSS events (6/22/09 and 7/6/09) is smaller than the RAS events (1/29/09 thru 6/11/09) and activity levels drop below clean-up levels over the 11 day period between RAS and FSS.			
		1	J Cunningham		0		0		Suspect Worker, samples may have been collected somewhere else, only 1 sampling event? Resample to confirm ROC concentrations			
		1	J Cunningham		1	samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations	1	yes, No BIAS Samples collected based on scan data for FSS, No signature and date from the site RSO was recorded on this survey. No raw scan data was provided in the SUPR.	Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations			

Summary of EPA review of Parcel G Trench

Number of TU's	**% of Parcel G total**
63	100%
Navy reviewed 63 total Trench Units to loo	
20	32%
0	0%
43	68%
EPA reviewed the 43 Trench Units recomm	
4	6%
0	0%
39	62%
Total Navy and EPA recommend for resam	
59	94%

Trench Unit	EPA score
TU089	0
TU118	0
TU151	0
TU111	0
TU078	2
TU079	2
TU103	2
TU106	2
TU107	2
TU119	2
TU067	2
TU068	2
TU069	2
TU071	2
TU072	2
TU073	2
TU074	2
TU075	2
TU076	2
TU080	2
TU082	2
TU083	2
TU085	2
TU087	2
TU088	2
TU091	2
TU092	2
TU093	2
TU096	2

ı Units

Total trench units in Parcel G
k for signs of potential falsification
Navy recommended confirmation sampling due to signs of potential falsification
Navy recommended reanalysis of archived samples
Navy recommended NFA = No further action due to signs of falsification, but potential further action due to uncertainty
ɱended for NFA
EPA score 0 = No specific findings of particular concern
EPA Score 1 = Need further review
EPA Score 2 = Need resampling before determination that the record supports ROD requirements met
ɔling

Note: TU 66 and TU 70 the Navy recommended for partial re-sampling only. However, both are marked for full resampling due to suspect soil from the fill unit that was used to fill those TUs.

TU097	2
TU098	2
TU099	2
TU100	2
TU101	2
TU102	2
TU102	2
TU104	2
TU108	2
TU115	2
TU116	2
TU117	2
TU121	2
TU124	2
TU204	2

EPA DTSC CDPH review of Parcel G Rad Data Evaluation

	Trench	Fill	Building Sites	Total	% of total
Tota Survey Units in Parcel G	63	107	32	202	100%
Navy recommended resampling	20	53	25	98	49%
EPA, CDPH, DTSC recommend resampling	39	54	5	98	49%
Total recommended resampling	59	107	30	196	97%
No signs of falsification found in data	4	0	2	6	3%
% of total recommended resampling	94%	100%	94%	97%	

The above was for Parcel G alone. Below is for entire Shipyard.

Total Survey Units in Hunters Pt Tetra Tech EC	*305*	*514*	*
Parcel G as % of total	21%	21%	*

* Parcel G has 4 former building sites, which is 12% of the total 34. The above chart shows s
The number of survey units at building sites for the entire site was not available.

DTSC review of Fill Units that received fill from trench units that were recommended for resampling

This spreadsheet shows which fill units contain soil received from trench units that were recommended for resampling b
Note that many fill units received fill from multiple trench unit sources

Parcel G FUs recommended for NFA
ES005
ES008
ES009
ES010
ES011
ES016
ES017
ES018
ES019
ES021
ES024
ES025
ES027
ES032
ES033
ES034
ES035
ES036
ES037
ES038
ES039
ES043
ES044
ES046
ES056
ES058
ES059
ES062
ES066
ES107
ES108
ES116
ES117
ES118
ES119
ES120
ES121
ES122
ES124

y the Navy and/or regulatory agencies

Associated Trench Unit	Navy Recommends confirmation sampling of a FU that went into this TU	Navy Recommends TU Confirmation Sampling (1=yes)	Reg Agencies Recommend Confirmation Sampling
TU070	1		
TU070	1		
TU071	1		
TU069	1		
TU070	1		
TU073			1
TU072	1		
TU072	1		
TU072	1		
TU072	1		
TU073			1
TU073			1
TU073			1
TU095		1	
TU100			1
TU117			1
TU095		1	
TU095		1	
TU097			1
TU072	1		
TU072	1		
TU081	1		
TU075			1
TU075			1
TU082	1		
TU076	1		
TU078	1		
TU078	1		
TU083	1		1
TU095		1	
TU115			1
TU113	1		
TU112	1		
TU112	1		
TU109		1	
TU109		1	
TU109		1	
TU110		1	
TU110		1	

Confirmationa Sampling Recommended (1=yes; 0=no)	Navy comment
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
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1	

ES125
ES127
ES129
ES142
ES143
ES144
ES154
ES158
ES199
ES221
ES229
ES466
ES470
ES474

TU110		1	
TU110		1	
TU109		1	
TU108			1
TU107			1
TU099	1		
TU121	1		
TU120	1		
TU124			1
TU151			1
TU114		1	
TU204	1		
TU204	1		
TU204	1		

1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
100.00	**Percent of total FUs**

DTSC review listing examples of process inconsistencies, i.e. it appears that the contractor did not follow the process requ

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

63
30%

uired in the workplan

Parcel G

TU 77	Gamma scans indicated a need for biased samples to be collected, but were not.
T U 81	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 90	Gamma scans indicated a need for biased samples to be collected, but were not.
TU 94	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 95	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU98	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU101	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 105	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 108	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 109	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 110	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 112	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 113	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 114	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 120	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 122	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 123	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU 129	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.
TU153	Post remediation gamma scans indicated a need for biased samples to be collected, but were not.

total trench units in Parcel G
of total trench units listed above

Fill Units

ES 225	No biased samples collected

* 46 ES units had biased samples collected, however, they are all suspect because there were no detections over the criteria for all. Possible falsified samples.

** There are no other indications that required sampling and scanning was not conducted. This is for Trench, Fill and Building units only that Navy indicated samples are suspect and more work is needed. This does not pertain to those units that the Navy has indicated NFA.

Parcel G Examples of types of concerns observed in the data and their prevalence

	Number of TU's	% of TU's
A	13	30%
B	2	5%
C	24	56%
D	15	35%
E	6	14%
F	2	5%
G	2	5%

	A	B
Total	13	2
%	30%	5%
TU067		
TU068		
TU069		
TU071		
TU072	1	
TU073	1	
TU074	1	
TU075	1	
TU076	1	
TU078	1	
TU079	1	
TU080	1	
TU082		
TU083		
TU085	1	
TU087		
TU088		
TU089		
TU091	1	
TU092		
TU093		
TU096		
TU097		
TU098	1	1
TU099	1	
TU100		
TU101		1
TU102		
TU103		
TU104		
TU106		

Narrow range of static cpm data indicates static measurements were not collected from different locations as required b
Gamma scans indicated a need for biased samples to be collected, but they were not
Gamma scan and static data inconsistent
Something else inconsistent, e.g. on & off-site lab data differ > 10X, Q-Q plots showed different populations, etc.
Missing gamma scan data in SUPR
Biased sampling results lower than other data sets
Falsification found, but Navy did not recommend for resampling

C
24
56%
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1

ased on scan results

D	E	F	G
15	6	2	2
35%	14%	5%	5%
1	1		
1	1		
1	1		
1	1		
1			
			1
1		1	
1			
1			
			1
1			
1			
1	1		
	1		
1			

TU107		
TU108		
TU111		
TU115		
TU116		
TU117		
TU118		
TU119		
TU121		
TU124	1	
TU151		
TU204		

1
1
1

1			
		1	
1			
1			

Trench Units with notes of signs of falsifiying and/or failure to follow workplan (which could create data quality concerns, even in the absence of signs of falsification)	
	(This sheet shows the columns excerpted from Spreadsheet 1)
Please Note: The score of 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems) have been noted. This does not indicate the severity of the concern.	
	So even if a concern has been noted, if the level of concern is relatively low, it still may not res
	In addition, please note that these observations were made in the 43 trench units that the Na
	The compilation below does not include the 20 trench units that the Navy has already recomm
Trench Unit	Overall score (0,1, or 2)
TU067	2
TU068	2
TU069	2
TU071	2

Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)	Signs of failure to follow workplan	Comments - Other
1	1 -RAS results look suspicious due to very low variability 2 - Data Eval Review form indicates allegations associated with this TU. From NRC petition, a former worker alleges that RSY-2 laborers were directed by J. Taylor to collect less than the Work Plan-required number of samples from soil excavated from TU067. Taylor told them to go get a sample "from anywhere." They went behind the Conex to another pad and got an unrelated "false" sample. Allen and Reggie 3 - Some very low results for Bi-214 and K-40 occur on the same days in the characterization and biased surveys, indicating that the samples collected on these dates are from a different population of soil than other results for the survey. 4 - missing COCs and raw scan data in reports	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPRs	This survey unit is suspect for the following reasons: 1 - Former worker allegations regarding screening of soil from this trench unit at the RSY2. This indicates a high potential that FSS results could also have been falsified 2 - RAS results do not have normal variability - suspect for falsification 3 - K-40 FSS results look like they are from a different popultaion than other surveys 4 - COCs and names of samplers missing in SUPR 5 - No RSO signatures on survey results 6 - Raw scan data missing from SUPR Recommend for re-sampling
1	1 -RAS results look faked due to very low variability 2 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports 3 - Multiple excavations, adjacent to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2 4- Population of K-40 on is much more variable on 9/19/07 than the remaining 10 events. From 9/19/07 to 9/20/07 variability drops.	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPR	This survey unit is suspect for the following reasons: 1 - Variability in sample results for FSS low - suspect for falsification 2 - K-40 FSS results look like they are from a different population than other surveys 3 - COCs and names of samplers missing in SUPR 4 - No RSO signatures on survey results 5 - Raw scan data missing from SUPR Recommend for re-sampling
1	1 -RAS results for all radionuclides have low variability. 2 - Ac-228 and Bi-214 RAS results are from a different population than all other surveys/samples 3 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports 4 - Multiple excavations, near to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2, DG K-40 more variable on 9/19/07 and 10/17/07 then other sampling events. 5 - Worker involved in allegations included in sample team 6 - K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.	1	Missing scan data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPR	This survey unit is suspect for the following reasons: 1 - RAS results do not have normal variability and are from different popultaiton than other surveys for Ac-228 and Bi-214 - suspect for falsification 2 - K-40 FSS results look like they are from a different popultaion than other surveys 3 - COCs and names of samplers missing in SUPR 4 - No RSO signatures on survey results 5 - Raw scan data missing from SUPR 6 - Worker involved in allegations performed work at this TU Recommend for re-sampling
1	1 - Scan survey data not available for review 2 - Static data range not provided in Data Eval Form. 3 - No RSO signature and date provided for static or scan data	1	Missing scan data, and static data, Chain-of-Custodies (COCs), names of samplers, Radiation Safety Officer (RSO) signatures in SUPRs	1 - Remediation was performed due to Cs-137, the time series plots show that most of the characterization results for Cs-137 were at or near zero, or were negative values. This indicates a data quality issue, and thus, un-reliable data. 2 - Gamma scan data missing, and no RSO signature and date on static and scan data. Recommend resample to confirm ROC concentrations for Ra-226 and Cs-137

TU072	2
TU073	2
TU074	2
TU075	2
TU076	2

1	1 - Inconsistent scan and static data; highest count for static survey was 4,279 cpm where scans ranged from 3,890 - 6,720 cpm 2 - SUPR missing COCs 3 - Worker involved in allegations included in sample team	1	Missing Chain-of-Custodies (COCs) in SUPR Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Scan and Static data are inconsistent 2 - SUPRs do not contain COCs for samples collected. Without this documentary evidence, the integrity, location, date, time or evidence of who had custody of the samples is missing. Therefore, the data is not defensible and not usable for decision making. Recommend resample to confirm ROC concentrations
1	1 - Scan and Static data inconsistency; narrow range of static data values which is not consistent with environmental monitoring. 2 - RSO signature on scan and static data results is missing 3 - Suspect worker involved with data collection	1	Missing RSO signatures on scan and static data results in SUPR Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - TU is downstream from Building 274 used for decontamination training and offices, Building 322 used by NRDL for development of radiation detection instrumentation (no contamination found and building demolished), and Buildings 313, 313A used by NRDL for Instrumentaiton laboratory and as stockroom and storage areas. 2 -Cs-137 was found above the action level in 2002; but no evidence of residual radioactivity above the release criteria was found in 2014.
1	1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm. 2 - Low values in scan data unusual because the low counts per minute are within a range that is below background. 3 - Scan data performed after FSS sample collection.	1	Scan data collected after FSS sample collection which is a departure from the Work Plan. Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - TU074 was not remediated but is adjacent to TUs 81 and 83 which did have contamination. 2 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shopt,and offices, a trades shop, and general store. No contamination is expected to have been released from this building; however, TU075 which was also connected to Bldg. 401 did have contamination. 3 - Scan and Static data are inconsistent, with unusually low results in scan data and in FSS data. 4 - Scan was performed after FSS samples collected. 5 - Sampler not identified in SUPR, person responsible for gamma scans and static measurements is listed on the NRC petition as a suspect worker. Recommend for re-sample
1	1 - Inconsistent static data (4,200 - 6,200 cpm) and scan data (1,370 - 7,720 cpm), scan data includes results below background levels. 2 - Suspect worker involved in data collection. 3 - Each event for each ROC has different variability with varying means.	1	Section 4 of the Data Eval Form states that there was no mention of pipe swipe surveys or sediment sampling in manholes. This would indicate a deficiency in the investigation and a departure from the Work Plan. Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g. Reviewer comment: this could indicate poor data quality and/or falsification. 2 - Static and scan data are inconsistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm: Low values in scan data are unusual because these low values are significantly lower than background. 4 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shopt,and offices, a trades shop, and general store. The narrative states that no contamination was found on surfaces or drains in the building, therefore it is not expected that contmamination released from this building. 5 - Section 4 of the Data Eval Form discusses the contamination that was found in this TU, despite the purported lack of contamination in Bldg 401. The narrative also states that there was no mention of pipe swipe surveys or sediment sampling in manholes, therefore the investigation did not follow the Work Plan and is deficient. This is important to note because contamination was found in this trench. 6 - Suspect worker involved in static/scan surveys Recommend re-sampling.
1	1 -Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm. Range for static data is too small indicating static data is falsified. 2 - All surveys/sample collection results have unusually low and/or non-detect results for Ac-228. This indicates either poor data quality or falsification. 3 - Suspect worker involved with data collection.	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. 2 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification. 3 - Suspect worker involved in data collection. 4 - Probable data quality issues with low Ac-228 results. Adjacent TUs 078, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results. Data Eval Form states TU076 is adjacent to Bldg 411. Similarily, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076. Recommend re-sample.

TU078	2
TU079	2
TU080	2
TU082	2
TU083	2

1	1 -Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm. Range for static data is small. 2 - Scan data is reported to be exactly the same as TU076 (3,000 - 7,000 cpm) 3 - Unclear whether Scan/Static personnel S. Brown is the same as Emitt Brown from NRC list 4 - K-40: mean stays the same but spread up and down varies between events Cs-137: negative measurments appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. 2 - Adjacent TUs 076, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results. 3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification. 4 - It is unclear whether suspect worker was involved in data collection. Data Eval Form states TU076 is adjacent to Bldg 411. Similarily, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076. Recommend re-sample.
1	Static data (5,326 - 5,943 cpm) and Scan data (3,430 - 6,790 cpm) are not consistent, static data has very narrow range of values compared to what would be expected for environmental conditions.	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079. 2 - Static and scan data are inconsistent; static results ranged from 5,326 - 5,943 cpm and scan data ranged from 3,430 - 6,790 cpm. 3 - Suspect worker involved in data collection. 4 - One sampling event with very narrow range in static results, indicating static data was collected from only one or two locations rather than 5 - Probable data quality issues with Ac-228 results, Adjacent TUs 076, 078, and TU108; and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0. . 6 -
1	Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm	1	Narrow range of static cpm data indicates static measurements were not collected from different locations as required based on scan results.	1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079. 2 - Adjacent TUs 076, and TU087 (also adjacent to Bldg. 411); and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0. 3 - Static and scan data are inconsistent; static results ranged from 6,089 - 7,126 cpm and scan data ranged from 4,250 - 6,500 cpm. 4 - Suspect worker involved in data collection. 5 - Probable data quality issues with Ac-228 6 - 1 sampling event
1	1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification. 2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).	1	Inconsistencies in date of when data was collected for sample 57 in comparison to issue date of report indicates either poor record-keeping or potential falsification of the sample result, both of which would be a departure from Work Plan requirements.	1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification. 2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm). 3 - Suspect worker involved with data collection. 4 - TU082 is adjacent to TUs 077, 080, 081 which all included several Ac-228 results at or below 0. Data Eval Form incidates Bi-212 and Pb-212 in the Th-232 decay series were consistent with other sample results in TU082. This may indicate a data quality issue with the analysis and reporting of Ac-228. Recommend for re-sampling
1	1 - The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214. 2 - Pb-214 (daughter of Ra-226) noted to have two populations 3 - Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent. Static data range not provided. 4 - Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available. 5 - Static scan date and time not provided in SUPR 6 - Scanning was performed after FSS samples collected.	1	Scan data collected after FSS sample collection. Static date and time missing from SUPR. Scanning was performed after the FSS samples were collected.	1 - Sanitary sewer is associated with Bldg 401. Data Eval Form states that Bldg 401 was not identified in the HRA but that after it was leased, sealed radiological sourcs (dials and gauges) were stored in the building. Data Eval Form also states no contamination was identifed on surfaces or drains, therefore there is no reasonable potenetial that Bldg 401 activities contaminaed the sewer system. Note: Based on revelations about building scan falsification issues, the reviewer questions how thorough or accurate surveys done on surfaces or drains in this building were. 2 - Adjacent TUs include 076, 123, and 124. 3 - Static and scan data are inconsistent; static results were not provided but scan data ranged from 2,000 - 5,000 cpm. Even number cpm values is suspect. 4 - Scan data collected after FSS. This is suspect for falsification of Scan and Static measurement data. Recommend re-sample.

TU085	2
TU087	2
TU088	2
TU089	0
TU091	2
TU092	2
TU093	2
TU096	2
TU097	2
TU098	2
TU099	2
TU100	2
TU101	2
TU102	2
TU103	2
TU104	2
TU106	2
TU107	2
TU108	2

1	Mean and variability of bias samples less than FSS_SYS and characterization samples. Appear to represent a different population. Multiple rounds of excavation. On- and off-site samples differ by more than 10x.	0		Recommend resampling to confirm ROC concentrations for several reasons - inconsistent off-site lab results, mean and variability of bias samples inconsistent with FSS_SYS samples that appear to be a different population, evidence for multiple populations on Q-Q plots, 8 rounds of excavation.
1	10x difference between on- and off-site lab in 2 samples. Unusually small variability in Bi-214 data set.	1	No bias samples collected. Gamma scan conducted after FSS samples were collected.	This could be a data set where the scans were manipulated to remove highs, and then the FSS samples were biased to areas with low gamma scan result, but the form indicates that the gamma scan was performed after the FSS samples were collected. 7 manholes removed from this TU. Elevated gamma survey results were identified for Manholes MH340 and MH342, which were disposed as LLRW. Falsification identified in adjacent TU0086. Concern only moderate - could be real data.
0		0		Lower variability in FSS-SYS and FSS-Bias may indicate successful remediation or could indicate potential falsification (narrow range unusual). Low-to moderate concern. May be candidate for Tier 2 resampling. K-40: 1 event (3/4/08 RAS) has less variability than other 8 events.
0		1	No bias samples collected.	1 event. Otherwise no concerns
0		0		Box plots and Q-Q plots indicate different populations. Less variability in Bi-214 samples may mean success in remediating this SU, but could also mean falsification. Resample due to uncertainty.
0		0		Due to identification of Cs-137 in a pipe removed from this TU, 37 biased samples were collected from the bottom of the trench. No exceedances. Low to moderate concern due to unusually low variability for Bi-214. However, this site was a Cs-137 site. Resample due to uncertainty.
0		1	No date for Statics.	One pipe segment had Cs-137 above release criteria, so 23 biased samples were collected along the trench bottom. No contamination found. However, due to the low variability of the Bi-214 data, the lack of an off-site lab sample for the FSS data set, and the scan/static inconsistencies (including no dates for the static survey), this SU should be resampled.
1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1	No bias samples collected. No date for statics.	Resample. (no date for statics, statics inconsistent with TU 96; no biased samples; low variability in Bi-214 results.) 1 event
1	Form notes, "Based on the findings of this evaluation, evidence of potential data falsification was found. It is unlikely the Biased Samples 9 to 79 represent actual conditions within TU097." KB notes that the inconsistent static survey data also indicates probable falsification.	1	No date for Statics.	Resample. (no date for statics, statics inconsistent with TU 97; no biased samples; low variability in Bi-214 results; falsification noted by Navy.) . K-40 FSS different population. Ac-228 and Bi-214 appear to be different populations at different times.
1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1	No sampler name.	Recommend resample to confirm ROC concentrations (statics inconsistent with gamma scan data set, low variability in Bi-214 results, no biased samples)
1	Inconsistent statics, no final bias samples, third set of characterization data has different distribution. 22 sampling events - Results for Ac-228, B-212, and Bi-214 have different variability for the Sys_1 2/2/09 sampling event. Similar to S0119. Cs-137 different for the 11/13/08, 5/13/09, 6/12/09 and 6/18/09 events.	1	No static survey date and time, no sampler/surveyor name	Some samples not analyzed within 2 weeks. Cs-137 remediation,Highest Cs-137 concentration recorded in Parcel G, but unusually low Cs-137 variability. Too many rounds of excavation. Inconsistent statics, different data distributions. Resample to confirm ROC concentrations
1	No final bias samples, low variability in B-214 data set. No gamma scan data in SUPR.	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.	No biased samples. Missing signature and lack of gamma scan data is troubling. Low variability in B-214 data. Only 1 sampling event FSS-SYS. Need to resample.
1	No gamma scan data available. Should have been in SUPR.	1	No Site RSO signature, no FSS_Bias. Gamma scan data suggest statics should have been collected.	Should resample due to uncertainty - lack of gamma scan data, no FSS_Bias samples, different populations in data sets.
1	Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.	Cs-137 remediation, K-40 may be from different pop, Recommend Resample to confirm ROC concentrations
1	1) Sampler Namer Not provided in SUPR. 2) Biased samples have low activity concentration when compared with the FSS samples even though gamma scan meausements were higher; therefore, samples may have been collected somewhere else	1		Biased Samples may have been collected somewhere else within the trench or elsewhere, Resample to confirm ROC concentrations,
1	1) Sampler Namer Not provided in SUPR. 2) No Bias Samples collected when warranted by Scan measurements, samples may have been collected somewhere else within the trench	1	yes, No BIAS Samples collected based on scan data	No Bias samples collected when warranted based on Scan Survey. Resample to confirm ROC concentrations. 1 event
1	1) Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset.. 2) Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0		Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations
0	Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0		Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations
1	Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm. Bias Samples have lower overall activity when compared with FSS samples.	1	yes, No BIAS Samples collected based on scan data	Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?

TU111	0
TU115	2
TU116	2
TU117	2
TU118	0
TU119	2
TU121	2
TU124	2
TU151	0
TU204	2

Please Note: The scoring as 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems) have been noted. This does not indicate the severity of the concern. So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation for resampling.

0		1	the scan and static survey date and time were not recorded	work performed by suspect worker, only 1 sampling event
1	K-40 Final sample set appears different from earlier. Ac-228 shows 2 different populations, scan measurements higher earlier inconsistent with final sample results	0		Close to impacted area, had a lot of remediation, Difficult to excavate more. Suspect worker Identified
1	Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold. K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events	0	1	Biased samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations
1	Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	0		Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Only 1 sampling event - FSS-SYS
0	1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	0		Only 1 sampling event - FSS-SYS
0	Bi-214 have different variability for the Sys_1 2/2/09 sampling event.	1		Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations
1	Some of the samples collected appear to be from a different population	1	yes, No BIAS Samples collected based on scan data for FSS	Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations
1	1)Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations	0		Suspect Worker, FSS Samples appear to be from a different population of samples. Samples may have been collected somewhere else , Resample to confirm ROC concentrations 6 RAS events followed by 2 FSS events. Variability for Ac-228 and Bi-214 for the final 2 FSS events (6/22/09 and 7/6/09) is smaller than the RAS events (1/29/09 thru 6/11/09) and activity levels drop below clean-up levels over the 11 day period between RAS and FSS.
0		0		Suspect Worker, samples may have been collected somewhere else, only 1 sampling event? Resample to confirm ROC concentrations
1	samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations	1	yes, No BIAS Samples collected based on scan data for FSS. No signature and date from the site RSO was recorded on this survey. No raw scan data was provided in the SUPR.	Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

Trench Units with notes of signs of falsifiying and/or failure to follow workplan (which could create data quality concerns, even in the absence of signs of falisfication)
Please Note: The score of 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems) have been noted. This does not indicate the severity of the concern.
Trench Unit
Count of total
% of total NFA
TU067
TU068
TU069
TU071
TU072
TU073
TU074
TU075
TU076
TU078
TU079
TU080
TU082
TU083
TU085
TU087
TU088
TU089
TU091
TU092
TU093
TU096
TU097
TU098
TU099
TU100
TU101
TU102
TU103
TU104
TU106
TU107
TU108
TU111

(This sheet shows the columns excerpted from Spreadsheet 7, which has excerpts from Spreadsheet 1)		
So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation for resampling		
In addition, please note that these observations were made in the 43 trench units that the Navy had previously designated as "No Further Action.		
The compilation below does not include the 20 trench units that the Navy has already recommended for resampling		
Overall score (0,1, or 2)	Signs of falsifying (1=Yes, 0=no)	Failure to follow workplan (1=Y, 0=N)
39	33	31
91%	77%	72%
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	0
2	1	1
2	0	0
0	0	1
2	0	0
2	0	0
2	0	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	1
2	1	0
2	0	0
2	1	1
0	0	1

TU115
TU116
TU117
TU118
TU119
TU121
TU124
TU151
TU204

2	1	0
2	1	0
2	1	0
0	0	0
2	0	1
2	1	1
2	1	0
0	0	0
2	1	1

CDPH and EPA review of Building Site Survey Units		
Building	Survey Unit	Overalll score (0 to 2)
364	SU 20	2
364	SU22	0
364	SU 23	2
364	SU 24	2

Box Plots	Q-Q Plots	Rounds of excavation
Bias samples for Ac-228, K-40, and Bi-214 show less variability than FSS or characterization samples, but there were only 7 samples. FSS_SYS for Bi-214 have somewhat less variability than one might expect (range .2 to 1.0 pCi/g)		Cs-137, Ra-226 exceeded release criteria 150 cubic yards of soil removed, Post Remediation samples collected
		Cs-137 exceeded releases criteria, 44 soil samples collected 240 cubic yards were excavated and consolidated into trench 153
K-40 range seems unusually large and somewhat higher than typical for Parcel G (Form states: "The data range for K-40 was from 7.30 through 23.2 pCi/g.")		Ra-226 remediated
	FSS samples show different population for K-40	3 Ra-226 exceeded release criteria

Gamma scan or static concerns
" no instrument information, no calibration due date, no static surveyor name, and no approved surveyor name was reported for this survey." "Many measurements throughout the combined site exceeded the investigation limit of 3-sigma plus background. Summary statistics were not provided in the FSSR for individual survey units. Locations above the limit of 3-sigma plus background were only highlighted in yellow as shown in Appendix B."
scan and statics provided, no instrument or calibration information and statistical calculations
Scan and statics provided. Form states "However, no instrument information, no calibration due date, no static surveyor name, no approved survey name was reported for this survey." Form states about gamma scan: "Many measurements throughout the combined site exceeded the investigation limit of 3-sigma plus background. No summary statistic was provided in the FSSR report for individual survey units. Locations above the 3-sigma plus background were highlighted in yellow in Appendix B."
many scans exceeded 3 sigma plus background

On vs offsite lab	Time Series	Signs of falsifying (1=Yes, 0=no)
2-6 month delay offsite analysis, FSS Samples 45-72 wer collected 10/20/2009 dates reported 10/21/2009 FSSR Report. Form says in regard to submission of sample to laboratory: " There was a delay time in sending samples to the offsite lab. Some samples were received at the offsite lab two to six months after sample collection. A delay is not directly indicative of potential data falsification." This raises a Chain of Custody uncertainty regarding potential tampering with samples during the delay		1
sample 48 counted onsite on 3rd day 3/11/2010 and one year later samples was collected and analyzed delay time analysis of samples, Samples 48-65 were collected 2/4/2009 Dates reported 2/5/2009, sample 65 collected 2/6/2009. Form says in reference to off-site laboratory: "There was a delay time in sending samples to the offsite lab. Some samples were received at the offsite lab two to six months after sample collection. Some onsite lab results were finalized months after the initial analyses. A delay is not directly indicative of potential data falsification." This raises a Chain of Custody uncertainty regarding potential tampering with samples during the delay.	Not clear that Ac-228 FSS_SYS is the same population based on the time series plot. Lower variability in FSS_SYS Bi-214 could mean successful remediation. Unclear what the relationship to the static locations and the Bias sample locations was.	1
on vs offsite lab consistent, FSS 72-89 were collected 2/4/2009 , results reported 2/5/2009 for all samples except 2/5/2009, FSS 75, 84,85, 86, 88 collected 2/6/2009 6 month delay time analysis after one year the sampled was collected and analyzed	Ac 228, Bi-214, K-40 Low for biased,	1

Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)	Signs of failure to follow workplan
delay in analysis of results, Cs-137 and Ra-226 impacted removed 150 cubic yards of soil	1	No calibation and information, no summary statistics
Survey Unit 22 does not exist		
Form identifies 3 inconsistent samples. Delay in analysis of results a year after the offsite analyzed results	1	Summary static data not provided, no calibration and instrument information.
K-40 biased concentrations low, systematic were high. Biased results do show anomalies, contrary to form conclusions, elevated ratings, suspicious potassium variation, only one round of sampling. scan measures exceed above 3 sigma above release criteria	1	No summary statistics on static measurements

Comments - Other	Followup needed, e.g. questions for Navy
Behind Building 364 peanut spill are (Note: for former building sites, resampling may not be difficult, since it is a matter of cutting through the asphalt cover and removing the aggregate base to get to the original surface.) Resampling should be at hot spots identified during the gamma scan of the surface.	Ask the Navy to explain delay offsite analysis
Building Behind 364,No FSS soil samples excavated and consolidated to TU 153. This SU was completely excavated due to TU 153.	
Behind Building 364, Peanut Spill	Explain the delay in soil analysis for onsite vs offsite,
Behind Building 364, Peanut Spill	Explain the delay in soil analysis for onsite vs offsite,

364	SU 25	2
364	SU 26	0
364	SU 27	2

		Ra-226 exceeded release criteria, 32.5 cubic yards soil removed
K-40 range "4.03 through 20.85 pCi/g."		Cs-137 exceeded release critria, 69 cubic yards of soil remediated
Form notes for Box plots: "Unusual small variance of FSS samples. One outlier was identified for K-40."	Form notes for quantile plots: "The graph shows low variability compared to other SUs"	0

scan and statics provided, scans above 3 sigma, no instrument, calibration due date, approved survey name
Many scan results above the release criteria, but static below release criteria. Form states about statics: "no instrument information, no calibration due date, no static surveyor name, no approved survey name was reported for this survey." Form states about gamma scan: "Many measurements throughout the combined site exceeded the investigation limit of 3-sigma plus background. No summary statistic was provided in the FSSR report for individual survey units. Locations above the 3-sigma plus background level were highlighted in yellow."
None provided in FSSR

on vs offsite lab consistent, FSS Samples 55-72 collected 2/4/2009, Collection date in report 2/6/2009	Ac 228, Bi-214, K-40 Low for biased,	1
on vs offsite consistent. Form states about off-site lab data: "There was a delay time in sending samples to the offsite lab. Some samples were received at the offsite lab two to six months after sample collection. Some onsite lab results results were finalized months after the initial counting. A delay is not directly indicative of potential data falsification." Delay may present opportunities for tampering.	Ac 228, Bi-214, K-40 Low for biased,	2
on vs offsite lab consistent, FSS Samples 1-15, 17, 18 collected on 12/6/2008, 16 collected next day. Form states about off-site lab data: "There was a delay time in sending samples to the offsite lab. Some samples were received at the offsite lab two to six months after sample collection. Some results were finalized 18 months after initial counting. A delay is not directly indicative of potential data falsification. These issues are typical of HPNS data and not directly indicative of potential data falsification." However, delay presents opportunity for tampering.		1

samples were collected more than one day and also delayed in analysis of soil samples, samples received offiste more than 6 months later, remediation occured occured Ra-226, some onsite lab results were finalized months after initial analysis	1	No summary statistics on static and scan measurements
delay time sending samples to the offsite 6 months, Cs-137 exceeded release criteria. Form identifies 5 inconsistent samples (2 Ac-228, 1 Pb-212, 2 Pb-214), says results were lower		no instrument calibration, instrument information, no calibration date, no static surveyor, no summary statics provided scan and static
delay in analysis of results, K-40 -6.75 to 13.65, survey unit where Peanut Spill site occured no bias samples taken and no remediation, samples were collected more than one day and also delayed in analysis of soil samples	1	No Scan or static data provided

K-40 on avg higher than other bldgs Parcel G, Behind Building 364 Peanut Spill	
Behind Building 364, Peanut Spill. 69 cubic yards of soil removed as LLRW (Ra-227 and Cs-137). Area remediated was moved into SU 30. SU-26 became a buffer zone (Class 2). Because the remediated area became SU 30, no need to resample SU 26.	
Site off spill, significant spills, time series failed, 2-6 months later delay, missing scan data from the FSSR, Peanut spill area, Form said "no remedial action" and also "peanut spill excavation." Needed to scan entire surface area. Unusually low variability in Bi-214 data (range is about .1 to .7 pCi/g). Given the low variability in Bi-214, the fact that one FSS_SYS sample was collected 2 days later on the day the samples were counted, and the delay sending samples to the off-site lab, falsification appears likely. Sample collected late may have replaced a “hot” sample.	